

A STUDY OF THE SEASONAL DECLINE OF BIRD SONG.

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THIS study of the decline of bird song was made at the 1914 Summer School of the Biological Laboratories at Cold Spring Harbor, Long Island, while taking the course offered there in ornithology. Observations were begun July 1, and the last were made August 10, hence the period studied comprises forty-one days.

All work on the problem was confined to a limited area, not more than three quarters of a mile square, centering about the end of Cold Spring Harbor, which is an inlet from Long Island Sound. The region contains an unusual diversity of bird habitats, including open salt water, tidal marshes and sandy beaches, fresh water lakes, streams and small swamps, road-ways dotted with farm houses, orchards and open fields, scrubby pastures and dense woods. The altitude ranges from sea level, along the edge of the water to an elevation of from two to three hundred feet on the hills immediately surrounding the inlet.

There is nothing unusual about this vicinity that would effect the decline of song in any abnormal way. Perhaps the presence of so much water, surrounded by abrupt hills renders the atmosphere somewhat more humid than usual, but the average summer temperature is about the same as is found at that latitude inland.

Systematic observations were regularly taken many times each day. Every morning from 6.00 to 7.30 was spent in the study of song, as was the time from 10.00 to 11.30, and alternate afternoons were given to the same work. A large part of the other hours of the days was spent in the open, and always with pencil and notebook in hand, recording song data. The central parts of the area were studied a little more closely than the rest, but all the remoter sections were visited at least three or four times each week, especially when they harbored birds not found elsewhere in the locality.

Three mornings a week, the half hour between 7.00 and 7.30 was devoted in a peculiar way to one of three especially favorable

points, each place being visited once a week. On these occasions a prepared sheet of paper was used, having thirty vertical columns, one for each minute from 7.00 to 7.30, and every song or call heard during that half hour was carefully recorded, in the proper column. Thus the number of species singing, and the quantity of their song, were tabulated. This gave an accurate parallel study to the notes taken during the usual observation hours, checking any false deductions.

A large chart was kept in the study to which all field notes were transferred every evening. It contained forty-one vertical columns, one for each day from July 1 to August 10, and about fifty horizontal columns, each one set apart for a certain species. All notes taken July 1, were placed in the column under that date, the items on the various birds, each inserted in the proper horizontal column. The same was done for July 2, and so forth to the end of the period studied. Every day the notations on the song volume of each species, was compared with the song volume of that bird, for the previous day, so that the progress of the decline was carefully followed. Thus when the end of the period came, by running the eye along the notes of any column, the progress of that bird's song could be determined at a glance.

As an example of the character of the notations, those on the Catbird (*Dumetella carolinensis*) are here given, taken directly from the chart, though for the convenience of the eye, the items are listed one under the other, while on the chart they were all on one horizontal column, each note in the column under the proper date.

- July 1 — Catbirds are in full song.
" 2 — Ditto.
" 3 — Ditto.
" 4 — Ditto.
" 5 — Ditto.
" 6 — Ditto.
" 7 — Ditto.
" 8 — Ditto.
" 9 — Ditto.
" 10 — Perhaps the songs are becoming a trifle less vivacious, though this is a question.
" 11 — About the same full volume as last week — any diminution doubtful.

- July 12 — Ditto.
 “ 13 — Ditto.
 “ 14 — Intensity and frequency of song are lessening.
 “ 15 — Ditto.
 “ 16 — Ditto.
 “ 17 — Songs less frequent than yesterday.
 “ 18 — Songs have become infrequent.
 “ 19 — Ditto.
 “ 20 — At best, songs are much softer and shorter than a week ago.
 “ 21 — Songs are very occasional.
 “ 22 — Ditto.
 “ 23 — Songs becoming less every day.
 “ 24 — Nothing heard but an occasional gurgle.
 “ 25 — Ditto.
 “ 26 — Ditto.
 “ 27 — No song at all.
 “ 28 — Ditto.
 “ 29 — A phrase of song heard rarely.
 “ 30 — Ditto.
 “ 31 — No song at all.
 Aug. 1 — Ditto.
 “ 2 — Ditto.
 “ 3 — Ditto.
 “ 4 — One short phrase of song heard.
 “ 5 — No song at all.
 “ 6 — Ditto.
 “ 7 — A single short phrase of song heard.
 “ 8 — No song.
 “ 9 — Ditto.
 “ 10 — Ditto.

NOTE:— The scold notes were numerous throughout the entire period.

It was immediately noticed that cold or rainy weather caused an evident depression in the songs of that day. Hence temperature, direction and strength of the wind, cloud conditions, humidity, and also the hour at which the observations were taken, as well as the exact localities visited, were daily recorded. In the final conclusions as to general song decline, local depressions caused by the weather, have been omitted, as they were of a purely temporary nature.

It would be interesting to repeat this study in the same locality for five or six successive years, keeping strict watch on the average temperature of each summer, to discover if a comparatively cool

summer caused an earlier decline than usual, or if a warmer season retarded the diminution.

The accompanying chart is a graphical presentation of the data given in this paper, showing the decline of bird song, for thirty-seven species, studied at Cold Spring Harbor, from July 1 to August 10, 1914. It will be seen that this chart is on the same plan as the one described above. The forty-one vertical columns represent the days of the period studied, and each wide horizontal line (taking the place of the notes on the horizontal columns) by its varying width indicates the song decline of a species. The birds have been arranged according to the date when the depression begins, the one affected first, being placed at the head of the list. The heavy black portions of the lines indicate maximum volume of song, and obliquely lined portions represent the days of lesser quantity. The volume of song of one species as compared with the volume of another is not taken into consideration at all, for the Song Sparrow (*Melospiza melodia melodia*) which was heard almost constantly, and the Meadowlark (*Sturnella magna magna*) which sang only occasionally, are both represented by black lines of the same width so long as they continue to sing at their maximum, which is up to July 21. After that date the narrowing lines show their decline, but there is absolutely no indication as to the relative volume of song between the two species.

At the end of the paper are several lists summing up the results. One of them contains those birds, concerning which manifestly insufficient data have been gathered, and another summer's study might show different results for some of these species. It must be remembered that the studies did not begin till the first of July, and if any of the birds commenced to decline prior to that date, the fact could only be surmised. Surely the majority were in full song at that time, and only further study, beginning in June will clear up the doubtful cases, which have also been listed.

The Robin (*Planesticus migratorius migratorius*) was heard continually during the first few days of July but a scarcely perceptible decline of song began as early as the seventh. In fact, had it been carefully studied from the middle of June, the song volume of July 1, in comparison with that of the preceding weeks, even then might have shown the first faint signs of diminution. In all probability

the decrease did not really begin till about the seventh, and from that date on through the rest of the month the decline was very gradual. There was a day or two when there seemed to be a temporary, though slight, increase, but by August 1 it was heard only occasionally, and during the last few days prior to August 10, only a few phrases were recorded now and then.

The Ovenbird (*Sciurus aurocapillus*) sang frequently up to the tenth of July, after which there was a very rapid diminution. The last song was heard on the sixteenth, though had its haunts been continually watched during the week following the sixteenth, it might have been recorded occasionally for a few days later. It is interesting to note that a full song, though softer than July's, was distinctly heard on August 7. Was this an accident, or is there a slight rejuvenation of song later in the season?

Any conclusion at all on the Kingbird (*Tyrannus tyrannus*) is but tentative as its data are not as full as for most of the other species. The song, if it may be called such, was heard occasionally throughout the first half of July and the last record is on the fifteenth. In all probability it would have been heard a good deal later had its particular haunts been more persistently studied. The call notes were numerous throughout the whole period, though they diminished somewhat during August.

The Red-winged Blackbird (*Agelaius phoeniceus phoeniceus*) gave its "kong-quer-quee" about the swamps till the thirteenth of July. It is a question whether or not diminution had commenced prior to July 1. After the thirteenth it was heard infrequently and the last record is the thirtieth. The sharp call notes were also noted throughout July, and as there is no record for them after August 1, their diminution seems to practically coincide with the song.

The White-breasted Nuthatch (*Sitta carolinensis carolinensis*) was noted occasionally during the first twelve days, and after that date its "yanks" were a good deal more in evidence, and this increase in call continued till about the thirtieth. After that date, and on through to the end of the period studied, it was heard in about the same lessened frequency of the early part of July.

Up to the fourteenth, the Catbird (*Dumetella carolinensis*) was heard repeatedly. After the tenth its vivacity may have lessened

somewhat, but it was a slight change at best. The diminution was rapid from the fourteenth to the twenty-fourth, and after that only an occasional gurgle or phrase of song was heard, the last record for any song at all being August 7. The scold notes were heard throughout the period.

Up to the fifteenth, the Redstart (*Setophaga ruticilla*) was heard frequently, but by the twenty-second the song had fallen off decidedly. It was noted occasionally till about the twenty-seventh, when an increase set in, and by August 2, the song was once more much in evidence and continued so, though a second decline was under way during the last few days of the period.

The Scarlet Tanager (*Piranga erythromelas*) was in full, rich song, till about July 16, though further study may show this date inaccurate by several days. From that time on the song declined steadily and the last one was recorded on the twenty-seventh. The "chip-churs" were heard throughout the period.

The Wood Thrush (*Hylocichla mustelina*) was singing on every hand the first sixteen days. About the seventeenth a slight diminution was apparent which rapidly increased, and after the twenty-fifth the species was comparatively silent, though occasional, soft, short songs were heard at intervals as late as August 7. The "whit-whit" calls were heard daily.

The Yellow Warbler (*Dendroica aestiva aestiva*) began its song decline with the Wood Thrush on the seventeenth, and was heard less and less till the twenty-third, when the diminution ceased. Between this date and the thirtieth it sang occasionally and then began to increase, and by August 3 it was again singing quite frequently, though not as much as during the first part of July. It was still in this semi-revived period when the studies ceased, August 10.

The Maryland Yellow-throat (*Geothlypis trichas trichas*) started its decline with the above two species on the seventeenth, but the diminution in this case was remarkably rapid, and the last song was recorded on the twenty-second, and that performance was short and feeble.

The Crested Flycatcher (*Myiarchus crinitus*) was often heard calling in the woods through the early part of July. After the tenth the rapidly repeated roll calls became less frequent, and the

last record for one is the fifteenth. The single note whistles did not diminish till the seventeenth, and from that date they gradually decreased, but were heard occasionally throughout the remainder of the period.

Data on the Cowbird (*Molothrus ater ater*) are very scant for they were few in number. Their Starling-like calls were heard at intervals up to about July 17. Whether or not any diminution had begun before the first could not be determined, but probably not. After the seventeenth they were rarely heard and the last record is on the twenty-third.

The first song of the Goldfinch (*Astragalinus tristis tristis*) was not noted till the seventeenth of July, though in all probability it could have been heard occasionally prior to that. By the twenty-third it was singing quite frequently though at no time did it become common, and this condition continued throughout the remainder of the period. Since the decline set in some time after August 10, there are no data concerning the matter. The flight calls were heard occasionally from the beginning, and when the period of song began, they increased in frequency.

The Yellow-throated Vireo (*Lanivireo flavifrons*) remained in full song till about the nineteenth, when the diminution began which continued to the middle of the first week of August. The song did not cease altogether, however, and throughout the rest of the period it was heard almost every day, though infrequently.

The decline of the House Wren's song (*Troglodytes aëdon aëdon*) is about the same as that of the Yellow-throated Vireo. The diminution began about the nineteenth and continued till the thirtieth. The low ebb of song reached then about held its own through the rest of the period, and it was heard only once or twice each day after the last week of July.

The Wood Pewee (*Myiochanes virens*) began its decline almost imperceptibly around July 20, and from that day it gradually became less and less, though the daily diminution was scarcely evident. August 10, when the studies came to an end, it could still be heard quite frequently in sunny spots in the woods.

The story of the Red-eyed Vireo (*Vireosylva olivacea*) is almost identical with that of the Pewee, though perhaps its diminution is a trifle more marked. It too, gradually began to lessen in volume

about July 20, and the falling off continued bit by bit throughout the rest of the period. On August 10 it was singing infrequently.

The Song Sparrow (*Melospiza melodia melodia*) began to lose in volume and frequency about the twenty-first. Its decline, like that of the Pewee and Red-eyed Vireo, was very gradual, and there were days after the twenty-first when its cheering song could be heard quite often, but by August 10 it was singing only occasionally.

The data for the Meadowlark (*Sturnella magna magna*) are not as full as for most of the other species, and at best it was heard but seldom. Since only a few were seen at intervals it is difficult to determine whether or not the species was still in full song July 1. The frequency with which it sang the first week remained about constant till around the twenty-first, and after that it was heard but rarely. The last song recorded is on August 7.

The trill of the Chipping Sparrow (*Spizella passerina passerina*) began to diminish July 22. The decline was not rapid, and like the Song Sparrow, it could be heard daily throughout the remainder of the period, but each week witnessed a decided lessening, and during the last few days it was heard but seldom.

The Towhee (*Pipilo erythrophthalmus erythrophthalmus*) was heard frequently, though locally, in song and call to the twenty-third. From that date the decline set in, though gradually, and both song and call were noted occasionally, during the remainder of the period though each week becoming less.

The Black and White Warbler (*Mniotilta varia*) did not begin its song decline till July 26. The diminution was not rapid and was scarcely perceptible day by day. August 10 it was heard occasionally.

The Flicker (*Colaptes auratus luteus*) was heard calling daily throughout the entire period, though after July 25 it was not quite as much in evidence. This date marked a diminution, but a very slight one, and the calls at the close of the studies were almost as frequent as during the first week.

The calls of the Acadian Flycatcher (*Empidonax virescens*) were observed frequently, though locally, to the twenty-sixth, when a rapid decline set in, and it was last heard August 2.

Data on the Barn Swallow (*Hirundo erythrogastra*) are rather

scant. The calls did not begin to lessen till about the twenty-sixth, and from that point on the decline was gradual, and it was still heard occasionally August 10.

The song of the Field Sparrow (*Spizella pusilla pusilla*) began diminution about the twenty-eighth, though it may have started earlier as in this case the data are not satisfactory. At most it was heard infrequently all summer and only in certain regions, but after the twenty-eighth the songs became more occasional. The diminution was gradual, however, and it was heard a little each day to the end of the period.

There are also but few data on the Grasshopper Sparrow (*Ammodramus savannarum australis*). It was heard infrequently and locally to the end of July, the thirty-first probably witnessing the beginning of a gradual decline, though it may have started somewhat earlier. It was noted occasionally throughout the remainder of the period.

The rattle-calls of the Kingfisher (*Ceryle alcyon alcyon*) were heard daily throughout the entire period, though after August 1 it was not nearly so noisy.

The following eight species underwent no decline. The scold-notes of the Blue Jay (*Cyanocitta cristata cristata*) were heard occasionally each day, as were the "caws" of the Crow (*Corvus brachyrhynchos brachyrhynchos*), and the calls of the Downy Woodpecker (*Dryobates pubescens medianus*). The English Sparrow (*Passer domesticus domesticus*) was heard continually about barns, and the twitterings of the Chimney Swift (*Chætura pelagica*) were a common sound throughout the period. The Chickadee (*Parus atricapillus atricapillus*) put in an occasional appearance, and the Starling (*Sturnus vulgaris vulgaris*) was heard every few days. The Spotted Sandpiper (*Actitis macularia*) was heard giving its "peent" calls, whenever near its haunts. When August 10 came all of these were as much in evidence as they had been on July 1.

All of the birds thus far discussed are included in the graphical chart. The following seven were omitted as their data are scant and unsatisfactory, and further study is necessary before any conclusion can be reached concerning them.

The Black-throated Green Warbler (*Dendroica virens*) was re-

ported only six times — July 5, 9, 17, 20 and 22, and August 3. Each time the song was full and rich.

The White-eyed Vireo (*Vireo griseus griseus*) was recorded eight times — July 6, 15, 16, 20, 22, 29 and 31, and August 7. In each case the songs were full, though perhaps the last one heard showed a slight diminution.

The Phoebe (*Sayornis phoebe*) was heard but three times — July 9 and 20, and August 1, and on each occasion it was giving the "phœ-be" call repeatedly.

There are three song records for the Purple Finch (*Carpodacus purpureus purpureus*) — July 4 and 16, and August 3. The song was full on all three occasions.

The Carolina Wren (*Thryothorus ludovicianus ludovicianus*) was heard but rarely after 6.00 A.M., though in a certain locality it was heard daily in full song about 4.00 A.M., up to August 1. Since no 4.00 A. M. observations were made after that date, it is a question whether or not the early morning matins were continued. The data are not sufficiently full to allow any conclusion.

The two-note warble-whistle of the Baltimore Oriole (*Icterus galbula*) was heard throughout the period, as was the scold-note. The song had declined before July 1, leaving as a residue the two-note whistle which remained about constant throughout the period, hence no statement can be given.

The Brown Thrasher (*Toxostoma rufum*) was seen a number of times, but only his harsh call-note was heard.

The list following contains those birds, included in the graphical chart, on which the observations were not quite as full as was desired, and therefore statements concerning their decline have been made with some caution:—

Kingbird	Barn Swallow
Cowbird	Field Sparrow
Meadowlark	Grasshopper Sparrow

There is some doubt concerning the following birds, as to whether or not any decline in their song had begun prior to July, first:—

(Robin)	Cowbird
Kingbird	Meadowlark
Red-winged Blackbird	

The following species underwent a rapid decline:—

Ovenbird	7 days.	Maryland Yellow-throat	6 days.
Kingbird	6 " ?	Cowbird	7 " ?
Scarlet Tanager	12 "	Acadian Flycatcher	8 "

The following underwent a gradual decline:—

Robin	35 days.	
Red-winged Blackbird	18 "	
Catbird	25 "	
Redstart	27 " plus.	
Wood Thrush	23 "	
Yellow Warbler	25 " plus.	
Crested Flycatcher	25 "	
Yellow-throated Vireo	23 "	
House Wren	23 "	
Wood Pewee	22 " plus.	
Red-eyed Vireo	22 " plus.	
Song Sparrow	21 " plus.	
Meadowlark	18 "	
Chipping Sparrow	20 " plus.	
Towhee	19 " plus.	
Black and White Warbler	16 " plus.	
Flicker	16 " plus.	
Barn Swallow	16 " plus.	
Field Sparrow	14 " plus.	
Grasshopper Sparrow	11 " plus.	
Kingfisher	10 " plus.	

The following had a revival of song:—

(Ovenbird)
Redstart
Yellow Warbler

The following did not reach the period of full song till near the middle of July:—

White-breasted Nuthatch.
Goldfinch.

The following were singing regularly, though occasionally, at the close of the period studied, August 10:—

White-breasted Nuthatch
Redstart
Yellow Warbler

(Crested Flycatcher)
Goldfinch
(Yellow-throated Vireo)
(House Wren)
Wood Pewee
Red-eyed Vireo
Song Sparrow
Chipping Sparrow
Towhee
Black and White Warbler
Flicker
Barn Swallow
Field Sparrow
Grasshopper Sparrow
Kingbird

The following eight species underwent no decline:—

Blue Jay
Crow
Downy Woodpecker
English Sparrow
Chimney Swift
Chickadee
Starling
Spotted Sandpiper